rior region were derived from an original iron carbonate which was interbedded with carbonaceous shales which were themselves often impregnated with the same mineral. By a process of silicification these carbonate-bearing layers were transformed into the various kinds of ferruginous rocks now met with in this region. In some cases silicifying waters decomposed the iron carbonate in place, producing tremolite or actinolite and magnetite, which with the excess of silica remaining formed the actinolitic schists so frequently found associated with the iron ores. In other cases direct oxidation of the carbonate gave rise to bodies of hematite. In still other cases during the silicification of the rocks and the decomposition of the carbonate, the iron was removed by leaching and deposited in other places as it became oxidized. The jasper is supposed to be secondary and to have been deposited upon the removal of the iron carbonate in the process of silicification. The various theories which have heretofore been put forward to account for these interbedded iron and jasper layers are all in turn examined and pronounced insufficient to explain the phenomena met with everywhere in the study of the region.

BOTANY.[1]

THE WIND AND THE TREE-TOPS.—Since 1875 the writer has observed, in various parts of the country, 156 instances of injury to the trunks or branches of trees by wind.

Of all ordinary trees the common red maple appears to suffer most in hard winds, and the whole 156 observed cases of injury were confined to the various species of deciduous trees. The writer has seen hundreds of long-leaf pines in Georgia and Florida that had been blown up by the roots, but not one injured in trunk or branch while the tree was yet standing. Also close inquiry in Iowa and a whole summer's observation among the white pines of Tennessee failed to reveal a single case in which a tree of that species was injured by the wind. Of the 156 observed instances of injury sixty-one per cent were limbs split off at the crotch.

The crotches of a tree are its weak points. Nature recognizes this fact and guards against the weakness by swelling out the wood about the points of branching. Notably is this true of the white pine. In a large tree of this species the limbs come out in regular whorls about two feet apart. Midway between each two successive whorls the central axis of the tree has a minimum size. Above and below this point of least circumference the trunk gradually swells out to support the successive sets of branches.

In sixty per cent of the observed injuries the trunk divided into two or more large nearly equal branches, and one of these

[1] Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.

was the injured member. These large limbs, swaying in a hard wind, act as great levers, and are frequently not sufficiently supported at the crotch.

The meaning of all this is that a tree of which the trunk habitually divides into large nearly equal branches is much more liable to be injured by the wind than one having a strong central axis with many small limbs as, for example, the white pine.

Thus the accumulated effects of the wind have undoubtedly been to develop excurrent forms of tree-top. But the question naturally arises why pines, spruces, etc., have this form in greater perfection than other trees. Well, in the first place deciduous trees are usually injured by the wind only while in foliage during the summer months; but evergreens, being always in foliage, are practically exposed to the action of the wind for at least twice as great a time each year as are maples, elms, etc. Then too, according to palæontology, the cone-bearing evergreens came into existence many thousands, perhaps millions, of years before any tree that annually sheds its leaves. Thus the coniferous evergreens have had a vastly longer time in which to accumulate the effects of the wind and develop an excurrent form of top than have deciduous trees.—*B. F. Hoyt, Manchester, Iowa.*

A HYBRID APPLE.—Recently a student brought me a "Ben Davis" apple characteristically marked throughout a little less than three-fourths of its surface, the remainder (a wide crimson streak from stem to calyx) having undoubted marks of the "Jonathan" variety. The tree from which it came is a "Ben Davis," and a "Jonathan" tree stands within a distance of several rods. Upon cutting the apple it was found that the hybridization was confined to two carpels, and that the development of the flesh of these and the corresponding calyx-segments had been somewhat greater longitudinally and considerably less transversely than for the remaining carpels. Upon tasting the flesh of the "Jonathan" part of the apple it was found to differ quite perceptibly from that of the "Ben Davis" part.

It is probable that we have in this apple an example of the immediate effect of the pollen upon the fruit. In this case the "Jonathan" pollen affected the fruit (a) by changing the color of the skin, (b) by causing the hybrid segments to grow longer and narrower, thus approximating nearer to the "Jonathan" form, and (c) by changing the taste of the flesh.—*Charles E. Bessey.*

RUPPIA MARITIMA L. IN NEBRASKA.—This maritime plant has lately been brought to me from a pond near one of the many salt springs which occur in the vicinity of Lincoln. The species is not recorded in the catalogues of the Western State floras, viz., Minnesota (Upham), Iowa (Arthur), Missouri (Tracy), Kansas (Carruth); nor does it occur in the East, away from the seaside, with but a single exception. It is not found in the flora of In-

diana (Coulter and Barnes), Cincinnati (James), Michigan (Wheeler and Smith), Ohio (Beardslee) Buffalo (Day), Cayuga, N. Y. (Dudley), nor even of Washington, D. C. (Ward). It was discovered many years ago in Oneida county, N. Y., by Paine, who says of it: "This plant and its companion [*Naias major*] are new to the interior, having been known hitherto as exclusively maritime" (Eighteenth Ann. Rep. of the Regents of the Univ. of the State of New York on the State Cabinet of Nat. Hist., p. 133).

In Frank Tweedy's "Flora of the Yellowstone National Park," *Ruppia maritima* is said to be "common in the sluggish streams and water-holes of the hot-spring and geyser areas" (p. 66), and elsewhere (p. 20) the statement is made that it "has been observed in situations where the water had a temperature of 90° Fahrenheit."

The occurrence of this little plant in these widely separated localities is, to say the least, very interesting. From the sea-coast to the Oneida county, N. Y., station is fully 150 miles, thence to the Nebraska station is 1100 miles, and from the latter point to the National park is 700 miles. The distance from the Nebraska station to the Gulf of Mexico is about 800 miles.— *Charles E. Bessey.*

THE ROUGHNESS OF CERTAIN UREDOSPORES.—Recently while examining the uredospores of *Puccinia coronata*, a common rust of the oat, a student in my laboratory complained of the difficulty he had in making out the prickly (*stachlig*) surface of the spore-wall. The spores had been mounted in water in the usual way, and it was with the utmost difficulty that any roughness of the surface could be made out, and when made out it was so faint as to warrant the remark that "a character so difficult to be observed and so likely to be overlooked should not be made use of in descriptions." The spores, in fact, appeared in most positions to be perfectly smooth. The suggestion was made to examine them *mounted dry*, when lo! the prickles appeared with the greatest distinctness. This hint may be worth remembering in much of our work in botanical laboratories. — *Charles E. Bessey.*

ANOTHER "TUMBLE-WEED."—While riding through Phelps and Kearney counties, in South-central Nebraska, my attention was called to great masses of some much-branched, white-woolly plant which occupied the ditches by the side of the railway. Its appearance was so odd and so different from anything I had ever seen that I could not conceive what it could be. A fortunate stop of the train outside the limits of a town allowed me to secure specimens, which upon examination proved to be *Psoralea tenuiflora* Pursh. The leaves had fallen and the naked branches, in drying, had diverged still more than in life, giving to the plant

an appearance quite different from that which it bears when growing. The mode of detachment is the usual one of the formation of a joint at one of the lower internodes. In some cases two such joints were observed. The break at the joint is smooth and even, and reminds one of the separation of a leaf from its twig.

It may be well to say that the plant under consideration is densely silky woolly in every part excepting its principal stems. It is certainly not "minutely hoary pubescent when young," as described in the manuals (Gray, Man., p. 129; Coulter, Man., p. 56). On account of the loss of leaves it is impossible to determine whether this may not be the variety *obtusiloba* of Watson (Bib. Index N. A. Bot., p. 255). If so this is a much more northerly range than this variety of the species was supposed to possess. In all cases but one the variety is said to be a native of Texas. Creutzfeldt collected it in "Kansas" in 1853 (Pacific Railroad Report, 2, p. 126), and from the date of its collection (June) it must have been found in Eastern Kansas. Carruth, however, does not record it in his catalogue of Kansas plants (Trans. Kan. Academy of Sciences, Vol. v).—*Charles E. Bessey.*

Botanical News.—The October Journal of Botany contains a paper, by Baron F. von Mueller, on "New Vacciniaceæ from New Guinea." A new genus is described under the name Catanthera. It contains one species, *C. lysipetala* Mueller, which appears to have affinities with Oxycoccus, though strangely it shows relationship alwish the toClethreæ and Pyrolaceæ. It is an epiphyte.——In the same journal James Britten contributes an article on "The nomenclature of some Proteaceæ," in which the question of priority of Salisbury's names in the Proteads and other groups of plants is discussed. He says: "I am of opinion that there was a tacit understanding on the part of the botanical leaders of the period, including Brown, Banks and Smith, that Salisbury's work and names should, as far as possible, be ignored, not only on account of their strong antipathy to the man himself, but also, in Smith's case at least, to the views of classification which Salisbury promulgated;" an outrageous proceeding if true, as it appears to be.——Dr. Newberry gives additional reasons, in the October Torrey Bulletin, for regarding *Pinus monophylla* as but a variety of *P. edulis*. He says: "In the Rocky mountains all are two-leaved; in some arid portions of Nevada the tree is dwarfed to half its normal size, and all the leaves are single. Midway between these districts, in Southern Utah, may be found thousands of trees in which the leaves are half double, half single."—— Dr. Gray's Memorandum of a revision of the N. A. violets, in the Botanical Gazette, indicates certain interesting changes of arrangement and nomenclature. *Viola delphinifolia* Nutt. becomes *V. pedatifera* Don.; *V. cucullata* Ait. var. *palmata* becomes *V. palmata* L., while *V. cucullata* Ait. is considered to be "an entire-leaved variety of the Linnæan *V. palmata*." The suggestion that

V. pedatifida Don. is "probably only a marked geographical variety of that species [*V. palmata* L.] with all the leaves finely dissected," is worthy of further attention. In the Mississippi valley, where the three forms all grow, often quite near one another, their relations could be well expressed by considering *V. pedatifera* one extreme and *V. cucullata* the other, with *V. palmata* as an intermediate form. However, it will not do to consider the intermediate form, which is far less common than the others, as the type of the species. It is simply an intermediate form, and not a very constant one either.——L. H. Bailey's Preliminary synopsis of N. A. Carices (Proc. Am. Ac. Arts and Sciences) came to hand late in October. It contains notices of 289 species including, in addition to the strictly North American species, those of Mexico, Central America and Greenland.

ENTOMOLOGY.

A Remarkable Case of Longevity in a Longicorn Beetle (Eburia quadrigeminata).—On the 11th of July, 1886, I caught at sugar, which had been placed upon apple trees for the purpose of attracting moths, a light brown long-horned beetle, marked with ivory yellow spots on the elytra. My attention was particularly attracted at this time to the insect on account of a peculiar creaking sound which it began as soon as I picked it up. I had no difficulty in finding that the sound was produced by the rubbing of the posterior margin of the prothorax upon the anterior margin of the mesothorax. The same sound could be made after the insect was dead, by working backward and forward its head and prothorax. Several days after this occurrence I captured a specimen, similar to the first, upon the clothes of a friend, but it disappeared before I reached home. On the 17th of July I found a third specimen on a tree but a few feet distant from that upon which I discovered the first specimen; this individual was also evidently attracted by the sugar. Five days later, July 22, 1886, another specimen came into my posession under much more remarkable circumstances. Dr. Boyd, of Dublin, Wayne county, Ind., called my attention as I was walking along the street, and at once proceeded to remove two small corks with which he had closed two openings in the door-sill of his office. He then requested me to explain what had made the tunnels that evidently extended some distance into the sill. In reply to my questions, he stated that his attention had been called to the freshly made openings early in the morning; at that time the holes were much smaller, and were ragged around the edges. These rough edges he had smoothed with a knife so he could stop them tightly with corks. A short time after he made the discovery mentioned, his attention was attracted by a buzzing noise which came from one of the tunnels. This he put an end to by pouring chloroform into the opening, and then plugging it up with a cork. There had